

# **WETLAND DELINEATION AND STREAM CHARACTERIZATION**

This section contains the narrative portion of Draper Aden's March 2005 wetland delineation and stream characterization report, but omits Draper Aden's detailed field data sheets and supplementary maps. A single summary map for the delineation showing the entire reservoir site has been prepared and is included after Draper Aden's report. The U.S. Army Corps of Engineers conducted a field visit to the Cobbs Creek Reservoir site on March 8, 2005 and subsequently provided the field approved jurisdictional determination for wetlands which is included at the end of this section.

**PROPOSED CUMBERLAND RESERVOIR  
WETLAND DELINEATION  
CUMBERLAND COUNTY, VIRGINIA**

**DAA PROJECT NO. R02380-06**

Prepared for:  
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March, 2005

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BACK POCKET: DELINEATION MAP – ENTIRE PROJECT SITE

**PROPOSED CUMBERLAND RESERVOIR  
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## **1.0 SUMMARY**

During January, 2005, Draper Aden Associates personnel conducted a wetland delineation on approximately 1,500 acres within the Cobbs Creek watershed identified as a proposed regional reservoir. The delineation was conducted in accordance with the Routine Onsite Determination, as promulgated by the U.S. Corps of Engineers in their 1987 Wetlands Delineation Manual.

The purpose of the wetland delineation was to determine the type and acreage of wetlands and linear feet of waters of the U.S. that will be impacted by the construction of a reservoir. In addition, the wetlands were investigated to determine their relative function in the watershed and classified into three types of wetlands, according to the Cowardin Classification System:

- emergent (PEM)
- scrub/shrub (PSS)
- forested (PFO)

Using a stream classification method agreed to by the Corps of Engineers, stream assessments were performed at strategic locations along each tributary (based on field observations) to classify the waters of the U.S. into three categories:

- |                |  |
|----------------|--|
| • perennial    | with a score of 30 or greater          |
| • intermittent | with a score between 19-29 (inclusive) |
| • ephemeral    | with a score of less than 19           |

A vicinity map of the project is presented in APPENDIX 1. All Field Documentation Station data sheets and stream assessment sheets are presented in APPENDIX 2. Small-scale maps of the wetland delineation are presented in APPENDIX 3. A large-scale map showing the delineation of the entire project area is located in the pocket at the back of the report.

The following table lists the type of water resources, and the quantities of each that are present on the project site. The totals that are shown represent all of the waters and wetlands that are within the proposed boundary of the reservoir. The boundary is projected at the 350-foot elevation.

<b>Wetland Type</b>	<b>Linear Footage / Acreage</b>
waters of the U.S. – perennial	9,171 LF
waters of the U.S. – intermittent	64,634 LF
waters of the U.S. – ephemeral	0 LF
emergent wetlands	4.83 acres
scrub/shrub wetlands	6.6 acres
forested wetlands	20.65 acres
inundated man-made or beaver ponds	4.61 acres
<b>Total linear footage</b>	<b>73,805 LF</b>
<b>Total wetlands acreage</b>	<b>32.08 acres</b>
<b>Total open water acreage</b>	<b>4.61 acres</b>

## **2.0 SITE DESCRIPTION**

### **2.1 Location**

The subject site is located in the northern part of Cumberland County within the Cobbs Creek watershed, just south of the James River and the town of Columbia.

The site lies wholly within the Lakeside Village, Virginia, 7.5 minute USGS topographic quadrangle, surrounded by State Route 690 (Columbia Road) and State Route 686 (Cedar Plains Road). A well-maintained gas line easement bisects the project site from the southwest boundary to the northeast boundary.

### **2.2 History**

The subject site is mostly wooded with some open pasture for cattle and horses. The site is largely undeveloped.

### **2.3 Surface Hydrology**

The entire project site is contained within the watershed of Cobbs Creek, which has its origins near State Routes 690 and 686, and flows north to the James River.

### **2.4 Vegetation**

Most of the areas undisturbed by clearing for pasture are composed of upland deciduous trees (oaks, hickory, pine, cedars). One large area in the southwest corner of the property has been clear-cut within the past decade. That area was dominated by young pine and blackberry.

Areas considered to be vegetated wetlands were dominated by the following:

- emergent – soft rush
- scrub/shrub – alder, blackberry
- forested – maple, ironwood, willow

For specific species in each area, please review the field documents presented in APPENDIX 2.



### **3.0 OFF-SITE DELINEATION**

#### **3.1 Introduction**

The National Wetlands Inventory map, as prepared by the U.S. Department of the Interior (Fish and Wildlife Service) was reviewed. Maps prepared by the Soils Conservation Service (SCS) were reviewed. All referenced documents shall be retained in the files of Draper Aden Associates.

#### **3.2 National Wetlands Inventory**

Draper Aden personnel reviewed the National Wetlands Inventory Map, Lakeside Village quadrangle, issued by the U.S. Department of the Interior (1990). Wetlands areas that are at least six acres in size are represented on the map; smaller areas cannot be depicted. A copy of the NWI map is presented in APPENDIX 1.

The NWI map indicates the presence of wetlands within the boundaries of the site and are described as follows:

- PFO1A Palustrine, forested (broad leaved deciduous), temporary saturation.
- PUBHh Palustrine, unconsolidated bottom, permanently flooded, impounded
- R3UBH Riverine, upper perennial, unconsolidated bottom, permanently flooded

#### **3.3 Soils Conservation Service**

Draper Aden personnel reviewed maps prepared by the Soils Conservation Service (SCS). Soil units observed within the study area (FIGURE 4, APPENDIX 1) are listed below and descriptions of the principal soil units are presented in APPENDIX 1.

- Bentley, Danripple, Nathalie, Toast – includes sandy loam and gravelly sandy loam.
- Cecil, Clifford, Fairview – includes sandy loam, sandy clay loam, and clay loam
- Rasalo, Spriggs – includes sandy loam to clay loam and weathered rock
- Banister, Codorus, Halifax, Vance – includes sandy loam to clay loam
- Delila, Devotion – includes sandy loam

## 4.0 ON-SITE DELINEATION

### 4.1 Introduction

Field delineations were conducted during January, 2005.

Wetlands were delineated using field criteria described in the 1987 manual and procedures meeting the requirements of the Routine Onsite Determination Method as described in the 1987 and 1989 manuals.

Wetlands boundaries, as delineated by Draper Aden personnel (SHEET in pocket at back of report), were marked in the field with flagging bearing the inscription "WETLAND BOUNDARY." Draper Aden personnel surveyed the wetland boundary locations using a sub-meter, hand-held GPS unit (Trimble Unit). All areas shown within the wetlands boundary are believed to meet the three mandatory criteria for delineation as jurisdictional wetlands: wetlands hydrology, hydric soils, and hydrophytic vegetation, or they are considered to convey water to the James River as part of the waters of the U.S.

### 4.2 Hydrophytic Vegetation

The wetland areas are dominated by facultative deciduous trees and saplings (especially red maple, *Acer rubrum*), and shrubs (alder, *Alnus serrulata*). The emergent wetland areas were dominated by herbaceous species such as soft rush (*Juncus effusus*) and wool grass (*Scirpus cyperinus*).

### 4.3 Hydric Soils

In areas occupied by hydrophytic vegetation, the hydric nature of the soils was readily apparent. In some cases hydric soils were observed upland from the wetland boundary where there was no indication of hydrophytic vegetation. In general, the soils were composed of a sandy loam or sandy clay loam.

### 4.4 Wetlands Hydrology

At the time of the delineation, because of the high water table, most areas of the wetlands were either inundated or saturated to the surface. The presence of erosion patterns, creek channels, debris piles, and water-stained leaves also supports the establishment of wetlands hydrology.

All streams classified as perennial or intermittent were flowing during the delineation. Streams were assessed using a methodology agreed to by the Corps of Engineers. Each form completed for a tributary is presented in APPENDIX 2.

The stream form assigns scores to a stream channel using 32 criteria to classify a stream as perennial, intermittent, or ephemeral. Although a particular stream might have received a score low enough to be classified as ephemeral (by the the form), it was placed in the category of intermittent streams if there was any groundwater contribution to the flow. By definition of the U.S. Army Corps of Engineers, a stream that intercepts the groundwater table cannot be classified as ephemeral and is at least intermittent.

#### 4.5 Total Wetland Areas

The following table lists the type of water resources, and the quantities of each that are present on the project site. The totals that are shown represent all of the waters and wetlands that are within the proposed boundary of the reservoir. The boundary is projected at the 350-foot elevation.

<b>Wetland Type</b>	<b>Linear Footage / Acreage</b>
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#### 4.6 Jurisdictional Confirmation

During a site meeting on March 8, 2005, the project manager for the U.S. Army Corps of Engineers (Edward Graham, Nottoway Field Office) confirmed that the wetland boundary marked by flagging was in compliance with the regulations defined by the 1987 Manual. A letter to that effect is expected in the near future.

Mr. Graham cited Corps guidance that defined any channel with an ordinary high water mark that intercepted the groundwater table as at least intermittent. If the channel has vegetated wetlands on one or both sides, it is important to determine whether the stream is carrying water discharged from the wetlands or if it is contributing water to the wetlands. In the case of the former, the stream is independent of the wetlands and requires mitigation as waters of the U.S. If the stream contributes surface water to sustain the wetlands, then it is actually a feature of the vegetated wetlands and mitigation is only determined by the total acreage of the wetlands.

Streams classified as ephemeral because of their scores were classified as intermittent if there was a groundwater contribution to the stream. The mitigation tables included in this document have been prepared in accordance with the instructions given by Mr. Graham on March 8, 2005.

## 5.0 FUNCTIONAL ASSESSMENT

Numerous methodologies exist for the evaluation of functions and values associated with wetland habitats. For a preliminary functional assessment, Draper Aden personnel employed professional judgment to determine the range of functions and values exhibited by the wetlands on-site. This procedure involved a qualitative analysis of site conditions with regard to eight function categories, as described in *A Guide to Wetland Functional Design* (by Anne D. Marble, 1992).

1. nutrient removal/transformation
2. sediment/toxicant retention
3. shoreline stabilization
4. floodflow alteration
5. groundwater recharge
6. production export
7. aquatic diversity/abundance
8. wetland dependent bird habitat diversity

Four types of wetlands exist at the project site.

- **Ephemeral, intermittent and perennial stream channels (waters of the U.S.).** These areas include Cobbs Creek and its tributaries, which offer habitat for aquatic and semi-aquatic species including amphibians, reptiles, and certain species of riverine fishes (in the lower Cobbs Creek).
- **Emergent wetlands.** These areas are found most commonly at the head of drainages as groundwater emerges to supply the wetland with hydrology. Soft rush (*Juncus effusus*) dominates the emergent wetlands. These areas offer minimal habitat for fauna because of the sparse vegetation associated with them; however, some species of reptiles and amphibians may find the fluctuation of water levels within them satisfactory.
- **Scrub/shrub wetlands.** These areas are found most commonly along the tributaries, especially where beaver activity and clearing is prevalent. Blackberry (*Rubus argutus*) and alder (*Alnus serrulata*) dominate these wetlands.
- **Forested wetlands.** These areas are found most commonly along the tributaries creating buffers along the streams and at undisturbed heads of the drainages. These areas are dominated by red maple (*Acer rubrum*), sycamore (*Platanus occidentalis*), and ironwood (*Carpinus caroliniana*).

The existing wetland areas fit into four function categories, which are described below.

**A. Nutrient Removal/Transformation.**

This function involves the retention of nutrients, the transformation of inorganic nutrients to their organic forms, and the transformation of nitrogen into its gaseous form. Because nitrogen and phosphorus are usually of great importance to wetland systems, emphasis is placed on these nutrients. A wetland whose primary function is to retain and transform nutrients must primarily be capable of physically detaining the nutrients. This is accomplished when the water velocity entering a wetland slows so that sediments and their adsorbed nutrients may settle to the bottom of the basin.

The forested wetland areas located along the tributaries and the emergent wetlands located at the head of each drainage may serve to remove nutrients as the flow from the upland areas (some pasture lands) towards the streams. An established vegetative buffer utilizes the nutrients that are transported before they are discharged into surface waters.

**B. Sediment/Toxicant Retention**

Sediments frequently contain chemically and physically attached nutrients and contaminant materials, such as heavy metals, pesticides and other organic toxicants. Sediments and associated toxicants are carried by runoff or channel flow into wetlands, where they can be removed temporarily or permanently from the water column by sediment deposition. Burial, chemical breakdown, and/or assimilation into plant and animal tissues can remove nutrients and toxicants carried by sediments into the wetland. Sediments may also be temporarily retained by a wetlands before moving downstream.

Similar to nutrient removal, the wetland areas along the streams and at the head of each drainage may serve to remove sediments (from cleared pasture areas) and toxicants (such as fecal matter from livestock).

**C. Floodflow Alteration**

Floodflow alteration is the process by which peak flows from runoff, surface flow, and precipitation are stored or delayed. Wetlands, as well as upland areas, act to detain floodwaters by intercepting sheet flow and floodwaters. By lowering flood peaks, wetlands act to decrease flood-related damage. The importance of a wetland in altering floodflows depends to a great extent on its position in the watershed and its outlet characteristics. Wetlands with no outlet or a constricted one will store water during peak flows.

The wetland areas located at the head of each drainage serve to retard flooding. The broad entrance (where water collects) restricts to a channelized flow retain stormwater runoff and groundwater discharge before entering the stream. In addition, the presence of wetland plants serves to slow sheet flow through the wetland system.

#### **D. Production Export**

Production export is the production of organic material and its subsequent physical transport out of a wetland to areas downstream or to deeper waters within the same basin. This is product eaten by primary consumers (fish and aquatic invertebrates).

The forested and scrub/shrub wetlands along the tributaries serve to produce organic material, such as leaves and fruit, which is transported by the stream systems to Cobbs Creek and the James River each Fall.



Perennial Stream

Intermittent Stream

Forested Wetlands

Scrub-Shrub Wetlands

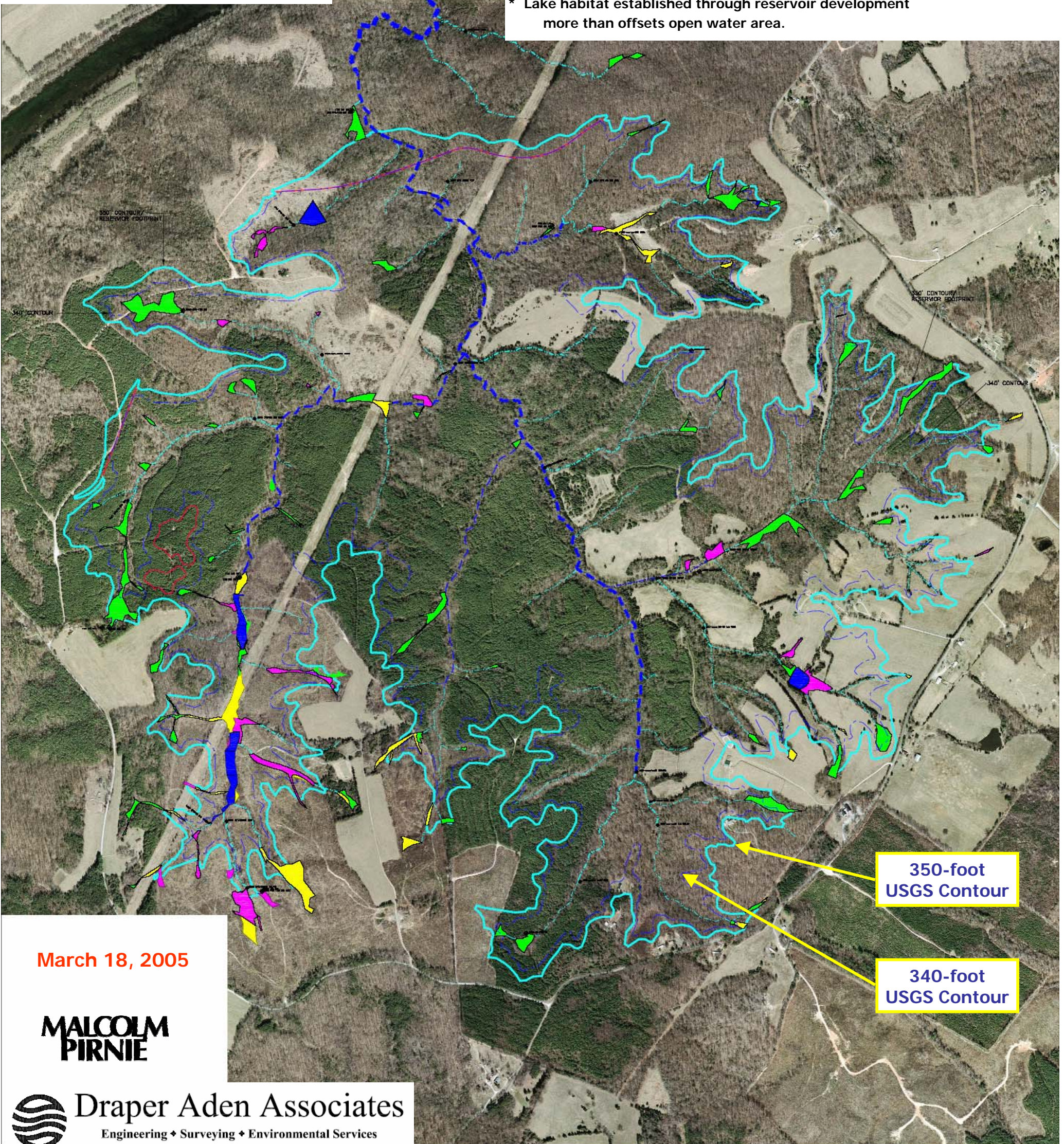
Emergent Wetlands

Open Water Areas



Wetland & Stream Delineation Results within USGS 350-foot Elevation Contour					
	Open Water	Emergent	Scrub-Shrub	Forested	Totals
Wetlands (acres)	4.6	4.8	6.6	20.7	36.7
Wetlands Requiring Mitigation (acres)	0 *	4.8	6.6	20.7	32.1
	Intermittent	Perennial			
Streams (miles)	12.24	1.74			

\* Lake habitat established through reservoir development more than offsets open water area.



March 18, 2005

MALCOLM  
PIRNIE

 **Draper Aden Associates**  
Engineering ♦ Surveying ♦ Environmental Services



**CORPS OF ENGINEERS FIELD APPROVED  
JURISDICTIONAL DETERMINATION**

DATE: 23 MAR 05

PROJECT NUMBER: 05-F0026

APPLICANT: CUMBERLAND COUNTY, VA AGENT: DRAPER ADEN ASSOCIATES

PROJECT LOCATION: ADJACENT TO STATE ROUTE 690 AND 686, SOUTH OF CUMBERLAND, VIRGINIA

EDWARD GRAHAM met you on to examine the parcel(s) described above. This serves as a field approved jurisdictional determination for wetlands (per the Corps of Engineers 1987 Wetland Delineation Manual) and/or waters of the United States (as defined at 33 CFR part 328.3) which are present on this property. ON 8 MAR 05

☒ We agree with the wetland delineation as flagged and as shown (survey completed/ survey not completed) on the site map entitled "AERIAL VIEW OF DELINEATED WETLAND AREAS, CUMBERLAND RESERVOIR". WE DO NOT CONCUR WITH VERBIAGE IN THE 21 MAR 05 COVER LETTER. FOR THE DELINEATION REVISED 16 MAR 05.

       The wetland delineation was flagged by a representative of the U.S. Army Corps of Engineers, as identified below.

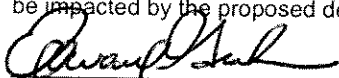
       There are jurisdictional waters or wetlands on your property. We recommend that you have wetland delineation performed.

       There are no jurisdictional waters or wetlands on the subject property.

       All waters/wetlands on the property are isolated and will not require a Department of the Army permit. However, a permit may be required from the Virginia Department of Environmental Quality.

A formal Corps of Engineers approved delineation confirmation is available at your request. Please note that any mechanized landclearing, stumping or grading (such as with a bulldozer and/or root rake) and/or any filling in jurisdictional areas will require a Department of the Army permit prior to such work occurring. An administrative appeals form is enclosed. This jurisdictional determination is valid for a period of five years from the date of this letter. If you have any questions contact the project manager listed below.

A condition of this jurisdictional determination is that you maintain the locations of the wetland delineation flags as they now are situated on the site. Once a plan of development is formulated it would be in your best interest to have the actual wetland boundary located by survey and superimposed on any future proposed plan to determine whether jurisdictional wetlands would be impacted by the proposed development, and to determine whether a Department of the Army permit would be required.



Corps of Engineers Project Manager

434-645-8986

Telephone number